

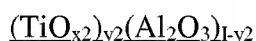
This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A process for producing two families of biofuels from at least one triglyceride, formed between at least one fatty acid and glycerol, characterized in that it comprises:

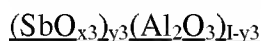
a reaction I of at least one transesterification step in which said triglyceride is reacted by heterogeneous catalysis with at least one primary monoalcohol selected from methanol and ethanol to produce a mixture of at least one methyl and/or ethyl ester of the fatty acids of the starting triglyceride(s) as first biofuel, and glycerol, separating heterogeneous catalyst from said mixture, wherein the heterogeneous catalyst comprises any of

titanium oxide or a mixture of titanium oxide and alumina having the following formula:



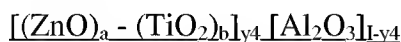
x2 having a value of 1.5 to 2.2 and y2, representing the weight ratio of the two oxides, having a value of 0.0005 to 1;

a mixture of antimony oxide and alumina having the following formula:



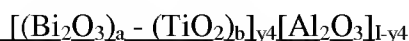
x3 having a value of 1.2 to 2.6 and y3, representing the weight ratio of the two oxides, having a value of 0.005 to 0.995;

a mixture of zinc oxides and titanium or a mixture of zinc oxide, titanium oxide and alumina having the following formula:



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.0005 to 1; or

a mixture of oxides of bismuth and titanium or a mixture of bismuth oxide, titanium oxide and alumina having the following formula:



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.005 to 1,

separating the crude glycerol from resultant mixture and subjecting the crude glycerol to a ~~purification step consisting of~~ a vacuum treatment to remove said at least one primary monoalcohol; and

an etherification step in which the resultant ~~crude vacuum treated glycerol from the purification step~~ vacuum treated crude glycerol is reacted directly with at least one olefinic hydrocarbon containing 4 to 12 carbon atoms to obtain at least one glycerol ether as the second biofuel; and/or

an acetalization step in which the ~~crude resultant~~ vacuum treated crude glycerol ~~from the purification step~~ is reacted directly with at least one compound selected from aldehydes, ketones and acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal as the second biofuel,

and directly adding the resultant etherified and/or acetalized crude vacuum treated glycerol to a fuel comprising all of said first biofuel.

2-4. (Cancelled)

5. (Cancelled)

6-8. (Cancelled)

9. (Previously Presented) A process according to claim 1, characterized in that: vegetable oil and methanol are introduced as continuously upflow into a fixed bed catalytic transesterification reactor preheated to a temperature which in the range of 170° to 210°C at an operating temperature in the range 3 to 6 MPa, with an HSV (volume of oil/volume of catalyst/hour) of 0.3/1 to 3/1 and an alcohol/oil weight ratio of 2/1 to 0.1/1; and

at the reactor outlet, depressurizing to at least partially eliminate the excess methanol and the glycerol formed is eliminated by simple static decantation;

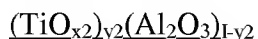
the conversion of the methyl esters obtained being in the range 85% to 97%.

10. (Previously Presented) A process for producing two families of biofuels from at least one triglyceride, formed between at least one fatty acid and glycerol, characterized in that it

comprises:

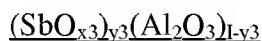
a reaction I of at least one transesterification step in which said triglyceride is reacted by heterogeneous catalysis with at least one primary monoalcohol selected from methanol and ethanol to produce a mixture of at least one methyl and/or ethyl ester of the fatty acids of the starting triglyceride(s) as first biofuel, and glycerol, separating heterogeneous catalyst from said mixture, wherein the heterogeneous catalyst comprises any of

titanium oxide or a mixture of titanium oxide and alumina having the following formula:



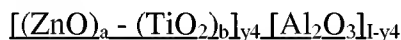
x2 having a value of 1.5 to 2.2 and y2, representing the weight ratio of the two oxides, having a value of 0.0005 to 1;

a mixture of antimony oxide and alumina having the following formula:



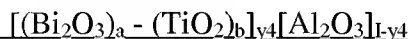
x3 having a value of 1.2 to 2.6 and y3, representing the weight ratio of the two oxides, having a value of 0.005 to 0/995;

a mixture of zinc oxides and titanium or a mixture of zinc oxide, titanium oxide and alumina having the following formula:



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.0005 to 1; or

a mixture of oxides of bismuth and titanium or a mixture of bismuth oxide, titanium oxide and alumina having the following formula:



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.005 to 1,

separating the crude glycerol from resultant mixture and subjecting the crude glycerol to a ~~purification step consisting of a vacuum treatment~~ to remove said at least one primary monoalcohol; and

an etherification step in which the resultant ~~crude~~ vacuum treated crude glycerol from the transesterification step is reacted directly with at least one olefinic hydrocarbon containing 4 to 12 carbon atoms to obtain at least one glycerol acetal as the second biofuel; and/or

an acetalization step in which the ~~crude~~ resultant vacuum treated crude glycerol from the transesterification step is reacted directly with at least one compound selected from aldehydes, ketones and acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal as the second biofuel,

and directly adding the resultant etherified and/or acetalized crude vacuum treated glycerol to a fuel comprising all of said first biofuel characterized in that the reaction I is continued in a second catalysis step in a second reactor having an inlet and an outlet carried out under the same operating conditions as in the first catalysis step, to achieve a methyl ester conversion of 97.5% to 99.5%, and at the outlet of the second reactor, excess methanol is removed by distillation to completely free the methyl ester of methanol.

11. (Previously Presented) A process according to claim 1, the etherification step is conducted between the glycerol from the transesterification step and isobutene, in the presence of an acid catalyst.

12-14. (Cancelled)

15. (Previously Presented) A process according to claim 1, characterized in that the acetalization step is carried out between the glycerol obtained from the transesterification step directly without neutralization or washing steps and an aldehyde, a ketone or an acetal derived from said aldehyde or said ketone in the presence of an acid catalyst.

16. (Previously Presented) A process according to claim 1, comprising
an acetalization step in which the glycerol from the transesterification step is reacted directly, without prior neutralization or washing treatments, with at least one compound selected from aldehydes, ketones and acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal; and
incorporating the glycerol acetal obtained into a fuel.

17. (Original) A process according to claim 16, characterized in that said fuel is a gas oil, a biodiesel or a gasoline.

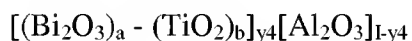
18. (Previously Presented) A process according to claim 17, characterized in that said fuel further comprises the methyl and/or ethyl ester of fatty acids of starting triglyceride.

19. (Previously Presented) A process according to claim 16, wherein said at least one triglyceride is rapeseed oil and wherein the glycerol is acetalized with acetone to form 2,2-dimethyl-1,3-dioxolane-4-methanol.

20. (Cancelled)

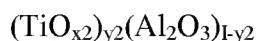
21. (Currently Amended) A process according to claim ~~16~~ 11, wherein said at least one triglyceride is rapeseed oil wherein the glycerol is etherified with isobutene and the monoalcohol is methanol.

22. (New) A process according to claim 1, wherein said catalyst comprises said mixture of oxides of bismuth and titanium or a mixture of bismuth oxide, titanium oxide and alumina having the following formula:



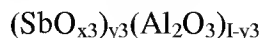
a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.005 to 1.

23. (New) A process according to claim 1, wherein said catalyst comprises titanium oxide or a mixture of titanium oxide in alumina having a following formula



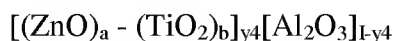
x2 having a value of 1.5 to 2.2 and y2, representing the weight ratio of the two oxides, having a value of 0.0005 to 1.

24. (New) A process according to claim 1, wherein the catalyst is a mixture of antimony oxide and alumina having a following formula



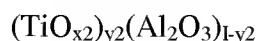
x₃ having a value of 1.2 to 2.6 and y₃, representing the weight ratio of the two oxides, having a value of 0.005 to 0.995.

25. (New) A process according to claim 1, wherein the catalyst is a mixture of zinc oxide and titanium having a following formula



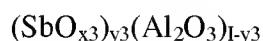
a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y₄ having a value of 0.0005 to 1.

26. (New) A process according to claim 10, wherein said catalyst comprises titanium oxide or a mixture of titanium oxide in alumina having a following formula



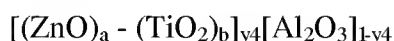
x₂ having a value of 1.5 to 2.2 and y₂, representing the weight ratio of the two oxides, having a value of 0.0005 to 1.

27. (New) A process according to claim 10, wherein the catalyst is a mixture of antimony oxide and alumina having a following formula



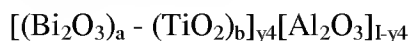
x₃ having a value of 1.2 to 2.6 and y₃, representing the weight ratio of the two oxides, having a value of 0.005 to 0.995.

28. (New) A process according to claim 10, wherein the catalyst is a mixture of zinc oxide and titanium having a following formula



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y₄ having a value of 0.0005 to 1.

29. (New) A process according to claim 10, wherein said catalyst comprises a mixture of oxides of bismuth and titanium or a mixture of bismuth oxide, titanium oxide and alumina having the following formula:



a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.005 to 1.